SESSION III: September 19, 2013

Evaluating the Use of Autonomous Recording Units to Monitor Yellow Rails, Nelson's Sparrows, and Le Conte's Sparrows

Anna Sidie-Slettedahl[1,2*], Rex Johnson[2], Todd Arnold[3], Jane Austin[4], Joshua Stafford[5], KC Jensen[1]

[1] South Dakota State University, Department of Natural Resource Management, Brookings, SD
[2] US Fish and Wildlife Service, HAPET, Fergus Falls, MN
[3] University of Minnesota, Department of Fisheries, Wildlife and Conservation Biology, St. Paul, MN
[4] US Geological Survey, Northern Prairie Wildlife Research Center, Jamestown, ND
[5] US Geological Survey, South Dakota Cooperative Fish & Wildlife Research Unit, Department of Natural Resources Management, South Dakota State University, Brookings, SD
[*]Corresponding author. Email: anna_sidie-slettedahl@fws.gov

Population status and habitat use of yellow rails (*Coturnicops noveboracensis*), Nelson's sparrows (*Ammodramus nelsoni nelsoni*), and Le Conte's sparrows (*Ammodramus leconteii*) are poorly quantified, so systematic surveys of these elusive species are needed to inform conservation planning and guide management. A standardized protocol for monitoring secretive marshbirds exists; however, these species call at night and may be missed during early-morning marshbird surveys. We tested the effectiveness of autonomous recording units (ARUs) to survey these species, wherein we analyzed recorded vocalizations using bioacoustics software. We deployed 22 ARUs at 26-28 sites in northern Minnesota and North Dakota, and conducted concurrent traditional broadcast surveys during May-June, 2010 and 2011. We compared ARU-based detections to the standard marshbird monitoring protocol using a paired t-test and used the robust design occupancy model in program MARK to estimate detection probabilities for each species by survey method. We found, on average, that ARUs detected 0.59 (Le Conte's sparrow), 0.76 (Nelson's sparrow), and 1.01 (yellow rail) fewer individuals per survey than were detected using the standard protocol. Detection probabilities using ARUs were 24% (yellow rails), 31% (Le Conte's sparrows), and 40% (Nelson's sparrows) lower than the standard protocol. Reduced detection by ARUs was likely due to the fact that human observers were able to detect birds at greater distances. ARUs may provide an effective means of surveying nocturnal secretive marsh birds if investigators correct for differential detectability from ground-based surveys. Arguably, reduced detectability may be outweighed by the increased spatial and temporal coverage feasible with ARUs, resulting in more cumulative opportunities for detection.

Developing Alternative Survey Methods for the Yellow Rail: Using Autonomous Recording Units to Survey for Yellow Rails

Kiel Drake[1*] and Danica Hogan[1]

[1]Bird Studies Canada, 115 Perimeter Road, Saskatoon SK, S7N 0X4
[*]Corresponding author. Email: kdrake@bsc-eoc.org

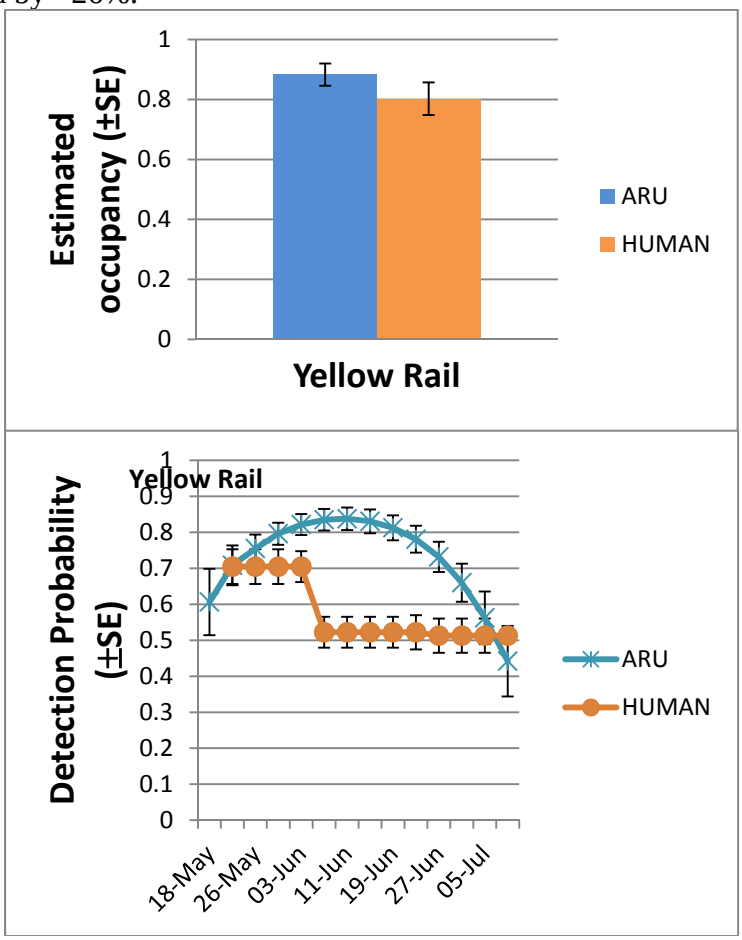
The Yellow Rail (*Coturnicops noveboracensis*) is one of the most secretive and least understood North American birds. Yellow Rails are not well-sampled by existing standardized bird surveys programs such as the Breeding Bird Survey (BBS), Christmas Bird Count, or Marsh Monitoring Programs; they tend inhabit areas that are not adequately covered by roadside surveys, and they vocalize primarily at night (Bart et al. 1984, Bookhout 1995); efforts to monitor Yellow Rails are sporadic and tend to be project-focused. Meeting the recommended survey guidelines requires an intensive effort whereby multiple nocturnal visits are made to each survey station, call-broadcast techniques are used, surveys are require to track individual birds on a minute-by-minute basis, and distance to unseen vocalizing birds is estimated (i.e. guessed) by the observer (Bazin and Baldwin 2007, Conway 2011).

Technological advances are providing new tools for monitoring natural systems, an example of which is the development of autonomous recording units (ARUs) and their application to the study of acoustically active animals. Several studies have shown that skilled birders listening to recordings can detect similar or greater numbers of species than field observers. Vocalizations are the preponderant detection cue for the identification of individuals during surveys for Yellow Rails, visual detections are rare because they inhabit dense vegetation, they are most active at night, and surveys should occur nocturnally when they cannot be seen. The Yellow Rail is a prime candidate for evaluating whether ARUs can generate survey information that is on par with information produced from traditional observer-conducted surveys. We tested the effectiveness of ARUs relative to observers conducting point counts in the field for garnering estimates of latent parameters of interest. Our objectives were (1) to compare estimates of abundance, occupancy, and detection probabilities from human surveys and recordings, and (2) to gain an understanding of the seasonal and diurnal chronology of calling behavior to enable making recommendations for time of day and season during which to conduct sampling (whether using ARUs or traditional surveys) to increase effectiveness of monitoring efforts.

During summers 2011 and 2012 we conducted surveys and made recording at 76 surveys to enable making a comparison between sampling methods. At each station 2-5 nocturnal surveys were made between 22:00-03:00 hrs. A total of 323 surveys were completed for an average of 4.25 surveys per station. The survey protocol followed was the Yellow Rail protocol (Bazin and Baldwin 2007); this is a 10-minute point-count survey that begins with a 5-minute passive survey and concludes with five successive 1-minute broadcast intervals during which Yellow Rail calls are broadcasted. The ARU data were sampled by listening to 1-minute segments of recordings that were made at the top of the hour between the times 22:00-03:00 hrs. For each station 10 1-minute segments were processed totaling 746 1-minute segments of recording.

Results from preliminary single season occupancy analysis in which data from both years were combined suggest that ARUs can provide effective monitoring data for Yellow Rails. Estimates of occupancy and detection probabilities derived from ARU data were 10% higher with smaller standard errors i.e., reduced by ~32% (see graphs on following page). The different supported model parameterizations of detection between ARUs and human surveys resulted in different seasonal patterns in estimates of detection. At its greatest difference, detection probability from

the ARU data was ~60% higher than detection during human surveys, and the standard error was reduced by ~26%.



We are currently in the process of further analysis using *N*-mixture models (Royle 2004, Kéry et al. 2005) to generate estimates of occupancy, abundance, and detection probabilities. We will elucidate results of this comparison of survey methodologies by discussing the assumptions and field logistics of each method, and highlight important additional work that is needed to answer questions about the effective sampling range of both humans and ARUs.

Notes on diet of Yellow Rails (*Coturnicops noveboracensis*) in rice fields on the wintering grounds in southwestern Louisiana

Donna L. Dittmann[1*] and Steven W. Cardiff[1]

[1]Museum of Natural Science, 119 Foster Hall, Louisiana State University, Baton Rouge, LA 70803
*Corresponding author. Email: donnaldittmann@gmail.com

Since the late 1980's, second-crop rice habitat in southwestern Louisiana has been known to support relatively large numbers of Yellow Rails during the fall. Presumably, these rice-inhabiting Yellow Rails represent wintering birds, but detections have been dependent on monitoring of mechanized harvesting operations which occur primarily during late October and November; exceptionally, we have observed second-crop harvest activity as early as 10 October and as late as 7 December, with Yellow Rails detected over this entire date span. Although relatively high densities in second-crop rice suggest that this habitat provides important cover and food resources for the species during a critical period of the annual cycle (arrival on wintering grounds, completion of pre-basic molt, etc.), there has been relatively little basic research on Yellow Rails in southwestern Louisiana's rice-growing region.

One obvious gap in our knowledge: what is the diet of Yellow Rails occurring in rice fields? To begin addressing this question, we examined stomach contents from a series of recent specimens collected in southwestern Louisiana rice field habitat. A total of 47 samples were accumulated over a 24-year period, with the majority acquired from 2005-2012. Seasonally, all samples are from the period 11 October-20 December. We also examined two stomach samples from salvaged specimens found dead on roads closer to the southwest Louisiana coast, and one January sample from pastureland near Baton Rouge in south-central Louisiana. This increases total sample size to 50, by far the largest existing set of samples from the wintering grounds. Of samples from rice habitat, 100% (n = 47) contained seeds or partially digested remains of seeds, and 94% (n = 44) contained at least traces of invertebrates; 91% (n = 43) contained arthropod remains, and 57% (n = 27) contained remains of gastropods. Three samples (6%) exclusively contained seeds. *Identification to species of individual food items is ongoing.* Individual food items consistently averaged very small. In terms of volume and frequency of food items, seeds dominated the majority of samples. Seeds of largest dimension were rice seeds up to 9 mm in length, but vast majority of seeds were much smaller. Whole rice seeds or trace amounts of rice were detected in 70% (n = 33) of samples; in 19% (n = 9) of samples, rice was the exclusive seed type, and in 30% (n = 14) of samples rice represented >50% of seeds present. Mean seed count per sample was 56 (range 1-449), mean number of seed taxa per sample was about 3 (range 1-9). In addition to rice seeds, several other taxa of grass seeds (e.g., *Panicum*, *Urochloa*) were present in relatively high frequency among samples; also found in lower frequencies were sedge (*Cyperus*), smartweed (*Polygonum*), and rattlebox (*Sesbania*). Largest arthropods were soft Lepidoptera larvae up to 30 mm in length, but vast majority averaged much smaller. Most arthropod remains were fragmentary, dominated by beetles, mantids, and spiders. Largest intact gastropods were small snails up to 5 mm diameter; most snail remains consisted of crushed shell fragments.

We also present a brief overview of historical occurrence of Yellow Rails in Louisiana, as well as an overview of rice crop phenology to help put into perspective the relatively unique "second-crop" rice phenomenon.

Management of prairies and wet sedge meadows to reduce woody vegetation.

Beth Middleton[1*]

[1] USGS National Wetlands Research Center
*Corresponding author. Email: middletonb@usgs.gov

Sedge meadows and prairies have become encroached by woody vegetation in recent decades, particularly as land management strategies have shifted away from grazing, burning, and grass cutting. Natural areas that harbor rare species such as yellow rails have often become too invaded by woody species to support the biodiversity of open grassland habitats. Former disturbances such as livestock grazing, mowing and fire may have once kept these grassland areas more open. Biodiversity related to species richness, landscape heterogeneity and function may decline in preserves, especially if traditional management once maintained this biodiversity. Contemporary preserves around the world often lack these disturbances and are now overgrown with tall vegetation, leaving land managers with a crisis to maintain rare species. Rare species might be better maintained by reintroducing certain disturbances, particularly if these practices help to control encroaching vegetation.